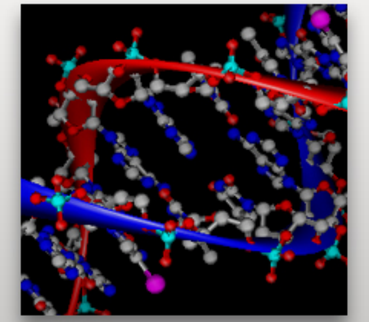
Using Bonjour in Your Applications and Devices

Session 500

These are confidential sessions—please refrain from filming or taking pictures.



OS Foundations

Using Bonjour in Your Applications and Devices

Stuart Cheshire
Bonjour Architect

http://developer.apple.com/wwdc2005/

Introduction

- Recap
- What's New
- Hands-on Coding
- Wide-Area Bonjour
  - Overview
  - Hands-on Setup

Recap

- TCP/IP made easy
- Just plug it in and it works
- Like USB, FireWire, Bluetooth, etc.
  - but…using IP
- Zero-configuration networking
  - Without DHCP server, DNS server, etc.

Technology

- Three Legs of Bonjour
  - IPv4 Link-Local Addressing
  - Multicast DNS
  - DNS Service Discovery
- Widely Available
  - Mac, Windows, Linux, etc.
  - Apple Products: Safari, Printing, iTunes, iChat, AirPort, etc.
  - Network printers
  - Network cameras
  - TiVo, Roku, etc.

What’s New?

http://developer.apple.com/wwdc2005/

RendezvousBonjour is now

Specifications

- Dynamic Configuration of IPv4 Link-Local Addresses
  - RFC 3927 now published
- Multicast DNS
  - draft-cheshire-dnsext-multicastdns-05.txt
- DNS-Based Service Discovery
  - draft-cheshire-dnsext-dns-sd-03.txt
- DNS Long-Lived Queries
  - draft-sekar-dns-llq-00.txt
- Dynamic DNS Update Leases
  - draft-sekar-dns-ul-00.txt
- NAT Port Mapping Protocol (NAT-PMP)
  - draft-cheshire-nat-pmp-00.txt

What's New

- Bonjour for Windows 1.0
  - Available for license today
  - Contact bonjourdev@apple.com
- Java API
  - Mac OS X 10.3.9 Panther
  - Mac OS X 10.4 Tiger
  - Windows
  - Solaris, Linux, BSD, etc.
- Wide-Area Bonjour
  - Unicast DNS as well as Multicast DNS
  - Internet-Wide Discovery

Demo

Hands-on coding

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Wide-Area Bonjour

Kiren Sekar
Bonjour Engineer

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Wide-Area Bonjour

- Overview
- Developer Impact
- Technology
- Adoption
- Demos

What's New…

- Dynamic DNS hostname
  - Globally unique
  - Persistent
- Inter-subnet service advertisement and discovery

…And What Stays the Same

- Same protocol semantics
- Same APIs
- Same user experience

The Bonjour Experience

- Zero configuration everywhere
  - Local networks, enterprise, Internet
- Reachability for the masses
- Mobile collaboration

Developer Impact

- Application enabling
  - Networked games, collaborative editing, distributed systems…
- Streamlined enterprise IT
  - User friendly, easily administered networks
- Hardware advantage
  - Enhanced user experience
  - Lower support costs

The Plumbing

- DNS Server stores resource records
  - Discovery: unicast queries
  - Advertisement: dynamic update
- DNS extensions for enhanced functionality
  - Update Leases
  - Long-Lived Queries
- NAT Port Mapping Protocol
- Details: http://developer.apple.com/networking/bonjour/specs.html

Client Setup

- Zero configuration discovery
  - Learn domains off the network
  - Automatically browse where we register
  - Additional user-configured domains (optional)
- Advertisement
  - Unique Hostname
    - Assigned by administrator
  - Registration domain
  - Security credentials (optional)

Where's the UI?

- Under development
- Core functionality accessible through Tiger's APIs
- Zero configuration browsing
- Download full-featured test UI
- Controls can be embedded in application (short term)

Server Setup

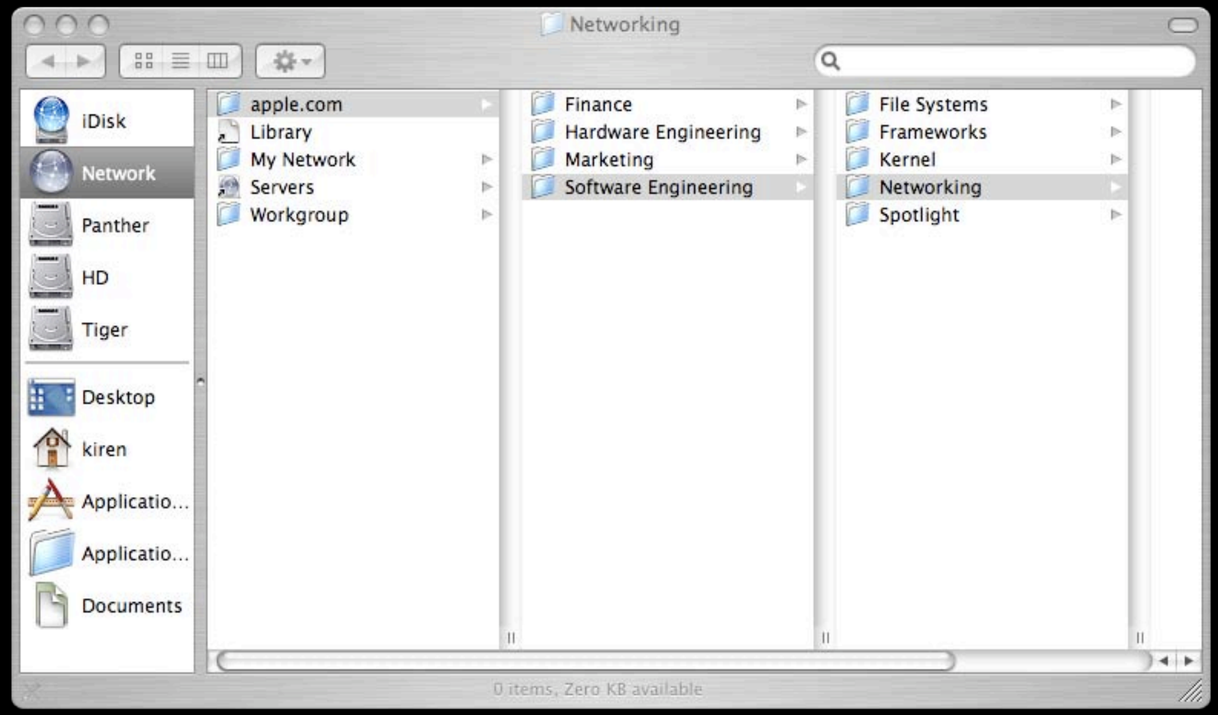
- Configure name server (named)
  - Zone file
    - Bonjour capabilities
    - Static services (optional)
  - BIND configuration file
    - Enable Dynamic Update
    - DNS-SEC authentication (optional)
- Run dnsextd for Update Leases and LLQs
- Detailed instructions at http://www.dns-sd.org/

Application Adoption

- Most apps don’t require changes
  - Empty string (“”) domain for registration and browsing
- System picks domain(s) based on user and network settings
- All browse results displayed in a flat list

Multi-domain Browsing

- Enumerate domains
- Explicitly browse in a single domain when selected by user



Demos

- Server
  - Static services
  - Secure dynamic update
- Client
  - Bonjour preference pane

Demo

Wide-Area Bonjour

Kiren Sekar
Bonjour Engineer

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More Information

http://developer.apple.com/wwdc2005/

Documentation, Sample Code, and Other Resources

http://developer.apple.com/wwdc2005/

Related Sessions

Tiger Lab: Adding Bonjour to Devices and Applications	Tiger Lab Tuesday 2:00
Implementing Networking Using the Cocoa Classes	Session 132 Thursday 10:30AM
Apple Campus Bash: Bonjour Plug-Fest	Apple Campus Bash Thursday 6:30PM

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Q&A

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